Crosswalk Between: *Wisconsin's Model Academic Standards for Science* and *Wisconsin's Model Academic Standards for Agricultural Education*

Instructions: Please fill out the third column illustrating how the proposed agriculture class meets the state standards in the first two columns. Information in the third column should include knowledge, concepts and skills, and a summery of the equivalent instructional time for the equivalent course. The first column lists Wisconsin's Model Academic Standards for Science. Column two illustrates the various agriculture performance standards that have been crosswalked to the science performance standards in the first column.

A. SCIENCE CONNECTIONS	Agricultural Education Standards	Crosswalk of Local School Curriculum
Performance Standards	**Performance Standards**	
By the end of Grade 12 students will:	*By the end of Grade 12 students will:*	
A.12.1 Apply the underlying themes of science to develop defensible visions of the future	B.12.4 Access and use information for a class presentation about the impact of new technologies on the products manufactured and produced; e.g., biotechnology D.12.5 Describe how biotechnology can enhance food and fiber production D.12.6 Understand the impact emerging technologies within hydroponics, aquaculture, and biotechnology have on the food and fiber industries and natural resources E.12.3 Explain the impact of climate change on existing agricultural systems E.12.4 Analyze practices used by farmers to reduce erosion and runoff to maintain soil fertility and productivity E.12.5 Analyze the impact and use of chemicals in the production and processing of food and fiber E.12.6 Analyze benefits, costs, and consequences of processing food and fiber on the environment	
A.12.2 Show how conflicting assumptions about science themes lead to different opinions and decisions about evolution, health, population, longevity, education, and use of resources, and show how these opinions and decisions have diverse effects on an individual, a community, and a country, both now and in the future	D.12.3 Understand how public policy affects the food, fiber, and ornamental plant industries D.12.4 Explore traditional and nontraditional food, fiber, and ornamental horticultural jobs/careers and identify the necessary skills, aptitudes, and abilities E.12.2 Analyze benefits, costs, and consequences of land use E.12.3 Explain the impact of climate change on existing agricultural systems E.12.6 Analyze benefits, costs, and consequences of processing food and fiber on the environment	
A.12.3 Give examples that show how partial systems, models, and explanations are used to give quick and reasonable solutions that are accurate enough for basic needs	A.12.2 Understand the variety, complexity, and size of the agricultural industry in the world B.12.1 Apply knowledge of technology to identify and solve problems D.12.1 Describe the global utilization of Wisconsin's food, fiber, and ornamental plant products	

Instructions: Please fill out the third column illustrating how the proposed agriculture class meets the state standards in the first two columns. Information in the third column should include knowledge, concepts and skills, and a summery of the equivalent instructional time for the equivalent course. The first column lists Wisconsin's Model Academic Standards for Science. Column two illustrates the various agriculture performance standards that have been crosswalked to the science performance standards in the first column.

A.12.4 Construct arguments that show how conflicting models and explanations of events can start with similar evidence	E.12.3 Explain the impact of climate change on existing agricultural systems E.12.5 Analyze the impact and use of chemicals in the production and processing of food and fiber E.12.6 Analyze benefits, costs, and consequences of processing food and fiber on the environment	
A.12.5 Show how the ideas and themes of science can be used to make real-life decisions about careers, work places, life-styles, and use of resources	B.12.5 Explore various career opportunities in the food, fiber, and natural resources industries using available forms of technology D.12.4 Explore traditional and nontraditional food, fiber, and ornamental horticultural jobs/careers and identify the necessary skills, aptitudes, and abilities F.12.4 Research a career in agricultural business marketing and management	**1. Identify career opportunities in livestock production.** **2. Identify career opportunities in pleasure and service animals.** **3. Identify science-oriented career opportunities in animal science.** **4. Identify career opportunities in the animal services sector.** **5. Identify career opportunities in animal science education and communication.**
A.12.6 Identify and replace inaccurate personal models and explanations of science-related phenomena using evidence learned or discovered	D.12.5 Describe how biotechnology can enhance food and fiber production E.12.5 Analyze the impact and use of chemicals in the production and processing of food and fiber E.12.6 Analyze benefits, costs, and consequences of processing food and fiber on the environment	
A.12.7 Re-examine the evidence and reasoning that led to conclusions drawn from investigations, using the science themes	E.12.1 Understand the application of agricultural technologies that can sustain production while reducing environmental impact E.12.4 Analyze practices used by farmers to reduce erosion and runoff to maintain soil fertility and productivity	
B. NATURE OF SCIENCE	**Agricultural Education Standards**	**Crosswalk of Local School Curriculum**
Performance Standards	**Performance Standards**	
By the end of Grade 12 students will:	*By the end of Grade 12 students will:*	
B.12.1 Show how cultures and individuals have contributed to the development of major ideas in the earth and space, life and environmental, and physical sciences	C.12.1 Demonstrate a working knowledge of leadership and leadership styles D.12.1 Describe the global utilization of Wisconsin's food, fiber, and ornamental plant products D.12.3 Understand how public policy affects the food, fiber, and ornamental plant industries	**1. Outline the major steps involved in the processing of animal carcasses.** **2. Identify the average dressing percentages for cattle, sheep, and hogs; determine factors that affect dressing percentage; and practice calculating dressing percentages.**

Instructions: Please fill out the third column illustrating how the proposed agriculture class meets the state standards in the first two columns. Information in the third column should include knowledge, concepts and skills, and a summery of the equivalent instructional time for the equivalent course. The first column lists Wisconsin's Model Academic Standards for Science. Column two illustrates the various agriculture performance standards that have been crosswalked to the science performance standards in the first column.

	D.12.5 Describe how biotechnology can enhance food and fiber production E.12.4 Analyze practices used by farmers to reduce erosion and runoff to maintain soil fertility and productivity	**3. Describe the chemical and/or physical changes that occur in meat during processing.** **4. Examine events or treatments that occur before, during, or after processing that may positively or negatively affect meat quality.** **5. Identify the edible and inedible by-products of meat animals.**
B.12.2 Identify the cultural conditions that are usually present during great periods of discovery, scientific development, and invention	D.12.3 Understand how public policy affects the food, fiber, and ornamental plant industries D.12.5 Describe how biotechnology can enhance food and fiber production	
B.12.3 Relate the major themes of science to human progress in understanding science and the world	D.12.6 Understand the impact emerging technologies within hydroponics, aquaculture, and biotechnology have on the food and fiber industries and natural resources E.12.5 Analyze the impact and use of chemicals in the production and processing of food and fiber	
B.12.4 Show how basic research and applied research contribute to new discoveries, inventions, and applications	B.12.4 Access and use information for a class presentation about the impact of new technologies on the products manufactured and produced; e.g., biotechnology D.12.5 Describe how biotechnology can enhance food and fiber production D.12.6 Understand the impact emerging technologies within hydroponics, aquaculture, and biotechnology have on the food and fiber industries and natural resources E.12.1 Understand the application of agricultural technologies that can sustain production while reducing environmental impact E.12.5 Analyze the impact and use of chemicals in the production and processing of food and fiber	
B.12.5 Explain how science is based on assumptions about the natural world and themes that describe the natural world	D.12.3 Understand how public policy affects the food, fiber, and ornamental plant industries E.12.3 Explain the impact of climate change on existing agricultural systems D.12.6 Understand the impact emerging technologies within hydroponics, aquaculture, and biotechnology have on the food and fiber industries and natural resources	
C. SCIENCE INQUIRY	**Agricultural Education Standards**	**Crosswalk of Local School Curriculum**

Crosswalk Between: *Wisconsin's Model Academic Standards for Science* and
Wisconsin's Model Academic Standards for Agricultural Education

Instructions: Please fill out the third column illustrating how the proposed agriculture class meets the state standards in the first two columns. Information in the third column should include knowledge, concepts and skills, and a summery of the equivalent instructional time for the equivalent course. The first column lists Wisconsin's Model Academic Standards for Science. Column two illustrates the various agriculture performance standards that have been crosswalked to the science performance standards in the first column.

Performance Standards	Performance Standards	
By the end of Grade 12 students will:	*By the end of Grade 12 students will:*	
C.12.1 When studying science content, ask questions suggested by current social issues, scientific literature, and observations of phenomena; build hypotheses that might answer some of these questions; design possible investigations; and describe results that might emerge from such investigations	B.12.1 Apply knowledge of technology to identify and solve problems C.12.2 Practice skills relating to communication, problem-solving, and decision-making through individual, group, and team processes	**1. Be able to explain how science of agriculture helped develop civilization.** **2. Be able to connect science areas with agriscience.** **3. Discuss advancements made through agriscience.**
C.12.2 Identify issues from an area of science study, write questions that could be investigated, review previous research on these questions, and design and conduct responsible and safe investigations to help answer the questions	B.12.1 Apply knowledge of technology to identify and solve problems C.12.2 Practice skills relating to communication, problem-solving, and decision-making through individual, group, and team processes D.12.2 Discuss the impact that climate and water have on the food, fiber, and ornamental horticulture production cycles throughout the world D.12.6 Understand the impact emerging technologies within hydroponics, aquaculture, and biotechnology have on the food and fiber industries and natural resources E.12.4 Analyze practices used by farmers to reduce erosion and runoff to maintain soil fertility and productivity E.12.5 Analyze the impact and use of chemicals in the production and processing of food and fiber E.12.6 Analyze benefits, costs, and consequences of processing food and fiber on the environment	**1. Be able to analyze and explain the importance of ruminants animals in a food chain.** **Through experiments –** **2. Be able to conclude what breaks down carbohydrates and what is the end result of the digestion of carbohydrates.** **3. Be able to conclude what are the factors that affect the use of enzymes and digestion.** **4. Be able to conclude what breaks down proteins and what is the end result of the digestion of proteins.** **5. Be able to conclude the end result of digested fats.** **6. Be able to conclude and identify the major components muscle contractions.** **7. Identify hazards in laboratories** **8. Describe safety in science and ag riculture** **9. Identify how to properly use a microscope** **10. Explain the meaning of safety**
	B.12.1 Apply knowledge of technology to identify and solve problems B.12.3 Use technology to acquire, organize, and communicate information by entering, modifying, retrieving, and storing data C.12.2 Practice skills relating to communication, problem-solving, and decision-making	**1. Students will use "TheAET.com" to help organize, document, and save their SAE information.** **2. Discuss advancements made through agriscience**

Crosswalk Between: *Wisconsin's Model Academic Standards for Science* and *Wisconsin's Model Academic Standards for Agricultural Education*

Instructions: Please fill out the third column illustrating how the proposed agriculture class meets the state standards in the first two columns. Information in the third column should include knowledge, concepts and skills, and a summery of the equivalent instructional time for the equivalent course. The first column lists Wisconsin's Model Academic Standards for Science. Column two illustrates the various agriculture performance standards that have been crosswalked to the science performance standards in the first column.

C.12.4 During investigations, choose the best data-collection procedures and materials, use them competently, and calculate the degree of precision of the resulting data	B.12.1 Apply knowledge of technology to identify and solve problems B.12.3 Use technology to acquire, organize, and communicate information by entering, modifying, retrieving, and storing data C.12.2 Practice skills relating to communication, problem-solving, and decision-making	**1. Discuss advancements made through agriscience** **2. Explain how volume is measured** **3. Explain how area is measured** **4. Explain how linear distance is measured.**
C.12.5 Use the explanations and models found in earth and space, life and environmental, and physical sciences to develop likely explanations for the results of their investigations	B.12.2 Select and communicate information in an appropriate format; e.g., oral, written, graphic, pictorial, multimedia C.12.2 Practice skills relating to communication, problem-solving, and decision-making	**1. Each student will communicate effectively, their SAE project with their peers.**
C.12.6 Present the results of investigations to groups concerned with the issues, explaining the meaning and implications of the results, and answering questions in terms the audience can understand	B.12.2 Select and communicate information in an appropriate format; e.g., oral, written, graphic, pictorial, multimedia B.12.4 Access and use information for a class presentation about the impact of new technologies on the products manufactured and produced; e.g., biotechnology C.12.2 Practice skills relating to communication, problem-solving, and decision-making	**1. Be able to evaluate and explain the various uses of reproduction technology, that is artificial insemination, embryo tranfer, cloning, and genomics.**
C.12.7 Evaluate articles and reports in the popular press, in scientific journals, on television, and on the Internet, using criteria related to accuracy, degree of error, sampling, treatment of data, and other standards of experimental design	B.12.1 Apply knowledge of technology to identify and solve problems B.12.2 Select and communicate information in an appropriate format; e.g., oral, written, graphic, pictorial, multimedia C.12.2 Practice skills relating to communication, problem-solving, and decision-making	
D. PHYSICAL SCIENCE	**Agricultural Education Standards**	**Crosswalk of Local School Curriculum**
Performance Standards	**Performance Standards**	
By the end of Grade 12 students will:	*By the end of Grade 12 students will:*	
Structures of Atoms and Matter		
D.12.1 Describe atomic structure and the properties of atoms, molecules, and matter during physical and chemical interactions	D.12.5 Describe how biotechnology can enhance food and fiber production D.12.6 Understand the impact emerging technologies within hydroponics, aquaculture, and biotechnology have on the food and fiber industries and natural resources E.12.4 Analyze practices used by farmers to reduce	

Crosswalk Between: *Wisconsin's Model Academic Standards for Science* and
Wisconsin's Model Academic Standards for Agricultural Education

Instructions: Please fill out the third column illustrating how the proposed agriculture class meets the state standards in the first two columns. Information in the third column should include knowledge, concepts and skills, and a summery of the equivalent instructional time for the equivalent course. The first column lists Wisconsin's Model Academic Standards for Science. Column two illustrates the various agriculture performance standards that have been crosswalked to the science performance standards in the first column.

	erosion and runoff to maintain soil fertility and productivity E.12.5 Analyze the impact and use of chemicals in the production and processing of food and fiber E.12.6 Analyze benefits, costs, and consequences of processing food and fiber on the environment	
D.12.2 Explain the forces that hold the atom together and illustrate how nuclear interactions change the atom	No significant match found	
D.12.3 Explain exchanges of energy in chemical interactions and exchange of mass and energy in atomic/nuclear reactions	E.12.3 Explain the impact of climate change on existing agricultural systems E.12.5 Analyze the impact and use of chemicals in the production and processing of food and fiber E.12.6 Analyze benefits, costs, and consequences of processing food and fiber on the environment	
Chemical Reactions		
D.12.4 Explain how substances, both simple and complex, interact with one another to produce new substances	D.12.5 Describe how biotechnology can enhance food and fiber production D.12.6 Understand the impact emerging technologies within hydroponics, aquaculture, and biotechnology have on the food and fiber industries and natural resources E.12.5 Analyze the impact and use of chemicals in the production and processing of food and fiber E.12.6 Analyze benefits, costs, and consequences of processing food and fiber on the environment	**1. Identify and discuss trends in animal production.** **2. Identify and discuss trends in animal product consumption.** **3. Identify and discuss trends in animal welfare and animal rights.**
D.12.5 Identify patterns in chemical and physical properties and use them to predict likely chemical and physical changes and interactions	D.12.5 Describe how biotechnology can enhance food and fiber production D.12.6 Understand the impact emerging technologies within hydroponics, aquaculture, and biotechnology have on the food and fiber industries and natural resources E.12.5 Analyze the impact and use of chemicals in the production and processing of food and fiber	
D.12.6 Through investigations, identify the types of chemical interactions, including endothermic, exothermic, oxidation, photosynthesis, and acid/base reactions	D.12.5 Describe how biotechnology can enhance food and fiber production E.12.4 Analyze practices used by farmers to reduce erosion and runoff to maintain soil fertility and productivity E.12.5 Analyze the impact and use of chemicals in the	

Instructions: Please fill out the third column illustrating how the proposed agriculture class meets the state standards in the first two columns. Information in the third column should include knowledge, concepts and skills, and a summery of the equivalent instructional time for the equivalent course. The first column lists Wisconsin's Model Academic Standards for Science. Column two illustrates the various agriculture performance standards that have been crosswalked to the science performance standards in the first column.

	production and processing of food and fiber E.12.6 Analyze benefits, costs, and consequences of processing food and fiber on the environment	
Motions and Forces		
D.12.7 Qualitatively and quantitatively analyze changes in the motion of objects and the forces that act on them and represent analytical data both algebraically and graphically	No significant match found	
D.12.8 Understand the forces of gravitation, the electromagnetic force, and the intermolecular force, and explain their impact on the universal system	No significant match found	
D.12.9 Describe models of light, heat, and sound and through investigations describe similarities and differences in the way these energy forms behave	D.12.5 Describe how biotechnology can enhance food and fiber production D.12.6 Understand the impact emerging technologies within hydroponics, aquaculture, and biotechnology have on the food and fiber industries and natural resources E.12.6 Analyze benefits, costs, and consequences of processing food and fiber on the environment	
Conservation of Energy and the Increase in Disorder		
D.12.10 Using the science themes, illustrate the law of conservation of energy during chemical and nuclear reactions	No significant match found	
Interactions of Matter and Energy		
D.12.11 Using the science themes, explain common occurrences in the physical world	D.12.2 Discuss the impact that climate and water have on the food, fiber, and ornamental horticulture production cycles throughout the world D.12.5 Describe how biotechnology can enhance food and fiber production D.12.6 Understand the impact emerging technologies within hydroponics, aquaculture, and biotechnology have on the food and fiber industries and natural resources E.12.3 Explain the impact of climate change on existing agricultural systems E.12.5 Analyze the impact and use of chemicals in the production and processing of food and fiber E.12.6 Analyze benefits, costs, and consequences of processing food and fiber on the environment	

Crosswalk Between: *Wisconsin's Model Academic Standards for Science* and *Wisconsin's Model Academic Standards for Agricultural Education*

Instructions: Please fill out the third column illustrating how the proposed agriculture class meets the state standards in the first two columns. Information in the third column should include knowledge, concepts and skills, and a summery of the equivalent instructional time for the equivalent course. The first column lists Wisconsin's Model Academic Standards for Science. Column two illustrates the various agriculture performance standards that have been crosswalked to the science performance standards in the first column.

D.12.12 Using the science themes and knowledge of chemical, physical, atomic and nuclear interactions, explain changes in materials, living things, the earth's features, and stars	D.12.5 Describe how biotechnology can enhance food and fiber production D.12.6 Understand the impact emerging technologies within hydroponics, aquaculture, and biotechnology have on the food and fiber industries and natural resources E.12.3 Explain the impact of climate change on existing agricultural systems E.12.5 Analyze the impact and use of chemicals in the production and processing of food and fiber	
E. **EARTH AND SPACE SCIENCE**	**Agricultural Education Standards**	**Crosswalk of Local School Curriculum**
Performance Standards	**Performance Standards**	
By the end of Grade 12 students will:	*By the end of Grade 12 students will::*	
Energy in the Earth System		
E.12.1 Using the science themes, distinguish between internal energies (decay of radioactive isotopes, gravity) and external energies (sun) in the earth's systems and show how these sources of energy have an impact on those systems	D.12.2 Discuss the impact that climate and water have on the food, fiber, and ornamental horticulture production cycles throughout the world. E 12.3 Explain the impact of climate change on existing agricultural systems	
Geochemical Cycles		
E.12.2 Analyze the geochemical and physical cycles of the earth and use them to describe movements of matter	D.12.2 Discuss the impact that climate and water have on the food, fiber, and ornamental horticulture production cycles throughout the world E 12.3 Explain the impact of climate change on existing agricultural systems	
The Origin and Evolution of the Earth System		
E.12.3: Using the science themes, describe theories of the origins and evolution of the universe and solar system, including the earth system as a part of the solar system, and relate these theories and their implications to geologic time on earth	E.12.2 Analyze benefits, costs, and consequences of land use E.12.3 Explain the impact of climate change on existing agricultural systems. E.12.4 Anaylze practices used by farmers to reduce erosion and runoff to maintain soil fertility and productivity	
E.12.4 Analyze the benefits, costs, and limitations of past, present, and projected use of resources and technology and explain the consequences to the environment	B.12.4 Access and use information for a class presentation about the impact of new technologies on the products manufactured and produced; e.g., biotechnology D.12.5 Describe how biotechnology can enhance food and fiber production.	

Crosswalk Between: *Wisconsin's Model Academic Standards for Science* **and**
Wisconsin's Model Academic Standards for Agricultural Education

Instructions: Please fill out the third column illustrating how the proposed agriculture class meets the state standards in the first two columns. Information in the third column should include knowledge, concepts and skills, and a summery of the equivalent instructional time for the equivalent course. The first column lists Wisconsin's Model Academic Standards for Science. Column two illustrates the various agriculture performance standards that have been crosswalked to the science performance standards in the first column.

	D.12.6 Understand the impact emerging technologies within hydroponics, aquaculture, and biotechnology have on the food and fiber industries and natural resources. E.12.1 Understand the application of agricultural technolgies that can sustain production while reducing environmental impact. E.12.2 Analyze benefits, costs, and consequences of land use E.12.4 Anaylze practices used by farmers to reduce erosion and runoff to maintain soil fertility and productivity E.12.5 Analyze the impact and use of chemicals in the production and processing of food and fiber E.12.6 Analyze benefits, costs, and consequences of processing food and fiber on the environment.	
The Origin and Evolution of the Universe		
E.12.5 Using the science themes, understand that the origin of the universe is not completely understood, but that there are current ideas in science that attempt to explain its origin	No significant match	
F. LIFE AND ENVIRONMENTAL SCIENCE	**Agricultural Education Standards**	**Crosswalk of Local School Curriculum**
Performance Standards	**Performance Standards**	
By the end of Grade 12 students will:	*By the end of Grade 12 students will:*	
The Cell		
F.12.1 Evaluate the normal structures and the general and special functions of cells in single-celled and multiple-celled organisms	B.12.4 Access and use information for a class presentation about the impact of new technologies on the products manufactured and produced; e.g., biotechnology D.12.5 Describe how biotechnology can enhance food and fiber production. D.12.6 Understand the impact emerging technologies within hydroponics, aquaculture, and biotechnology have on the food and fiber industries and natural resources. E.12.1 Understand the application of agricultural technolgies that can sustain production while reducing environmental impact.	**1. Describe the importance of animal reproduction.** **2. Explain how sperm are formed and how they differ from the female gamete.** **3. Explain the three factors that are used to evaluate semen.**
F.12.2 Understand how cells differentiate and how cells are regulated	D.12.5 Describe how biotechnology can enhance food and fiber production. E.12.1 Understand the application of agricultural	**1. Describe the components of an animal cell and explain their functions.**

Crosswalk Between: *Wisconsin's Model Academic Standards for Science* and *Wisconsin's Model Academic Standards for Agricultural Education*

Instructions: Please fill out the third column illustrating how the proposed agriculture class meets the state standards in the first two columns. Information in the third column should include knowledge, concepts and skills, and a summery of the equivalent instructional time for the equivalent course. The first column lists Wisconsin's Model Academic Standards for Science. Column two illustrates the various agriculture performance standards that have been crosswalked to the science performance standards in the first column.

	technolgies that can sustain production while reducing environmental impact	
The Molecular Basis of Heredity		
F.12.3 Explain current scientific ideas and information about the molecular and genetic basis of heredity	D.12.5 Describe how biotechnology can enhance food and fiber production D.12.6 Understand the impact emerging technologies within hydroponics, aquaculture, and biotechnology have on the food and fiber industries and natural resources. E.12.1 Understand the application of agricultural technolgies that can sustain production while reducing environmental impact	**1. Explain how to estimate the heritability of certain traits.** **2. Predict the genotypes and phenotypes from monohybrid and dihybrid crosses by using the Punnett square.** **3. Describe sex determination.** **4. Identify the male reproductive organs and their functions in mammals.** **5. Identify the female reproductive organs and their functions in mammals.** **6. Define and explain the steps of spermatogenesis and oogenesis, and describe sperm and egg characteristics.** **7. Describe the process of artificial insemination in common agricultural animals, including the collection, evaluation, extension, and storage of semen.** **8. Recognize signs of estrus, and identify methods or technology used to detect estrus in common agricultural animals.** **9. Determine the optimal breeding times and optimal placement of semen deposition in common agricultural animals.** **10. Discuss the advantages and disadvantages of artificial insemination and natural breeding.** **Define the process of estrous synchronization, semen sexing, embryo transfer, cloning, and genetic engineering.**
F.12.4 State the relationships between functions of the cell and functions of the organism as related to genetics and heredity	D.12.5 Describe how biotechnology can enhance food and fiber production. D.12.6 Understand the impact emerging technologies within hydroponics, aquaculture, and biotechnology have on the food and fiber industries and natural resources. E.12.1 Understand the application of agricultural	**1. Describe the importance of understanding genetics and recognize the impact of Gregor Mendel's development of the basic principles of heredity.** **2. Explain the principles of dominance and incomplete dominance.** **3. Explain the importance of understanding genetics.**

Instructions: Please fill out the third column illustrating how the proposed agriculture class meets the state standards in the first two columns. Information in the third column should include knowledge, concepts and skills, and a summery of the equivalent instructional time for the equivalent course. The first column lists Wisconsin's Model Academic Standards for Science. Column two illustrates the various agriculture performance standards that have been crosswalked to the science performance standards in the first column.

	technolgies that can sustain production while reducing environmental impact	**4. Explain how genotype and phenotype are different.** **5. Describe the importance of animal reproduction.** **6. List the parts and explain the functions of female and male reproductive systems.** **7. List and describe the phases of the estrous cycle.** **8. Explain how artificial insemination is performed.** **9. Explain the advantages and limitations of artificial insemination.** **10. Explain new technologies that are being used in reproductive management of animals**
Biological Evolution		
F.12.5 Understand the theory of evolution, natural selection, and biological classification	D.12.5 Describe how biotechnology can enhance food and fiber production. D.12.6 Understand the impact emerging technologies within hydroponics, aquaculture, and biotechnology have on the food and fiber industries and natural resources.	**1. Examine the history of taxonomic classification.** **2. Define organism and identify characteristics shared by all living things.** **3. List and describe the eight life processes of living organisms.** **4. Identify the seven levels of taxonomic classification.** **6. List the scientific names of common livestock and companion animals.** **7. Explain the meaning of anatomy and physiology.** **8. Describe how the animal body is organized in terms of cells, tissues, organs, and organ systems.** **9. Examine the four basic tissue types (epithelial, connective, muscle, and organ).** **10. List and briefly describe the major organ systems found in vertebrate animals.** **11. Describe the importance of understanding the anatomy and physiology in livestock and small animal production.**
F.12.6 Using concepts of evolution and heredity, account for changes in species and the diversity of species, including the influence of these changes on science, e.g., breeding of plants or animals	D.12.5 Describe how biotechnology can enhance food and fiber production D.12.6 Understand the impact emerging technologies within hydroponics, aquaculture, and biotechnology have on the food and fiber industries and natural resources	**1. Discuss the importance and explain the basics of animal reproduction.** **2. Describe the phases of the estrous cycle.** **3. Describe the process of fertilization in mammals.** **4. Determine the gestation length of common**

Crosswalk Between: *Wisconsin's Model Academic Standards for Science* and *Wisconsin's Model Academic Standards for Agricultural Education*

Instructions: Please fill out the third column illustrating how the proposed agriculture class meets the state standards in the first two columns. Information in the third column should include knowledge, concepts and skills, and a summery of the equivalent instructional time for the equivalent course. The first column lists Wisconsin's Model Academic Standards for Science. Column two illustrates the various agriculture performance standards that have been crosswalked to the science performance standards in the first column.

	E.12.1 Understand the application of agricultural technolgies that can sustain production while reducing environmental impact	**agricultural animals and define parturition.** **5. Discuss the events that occur leading up to, during, and after parturition and describe the problems that may be encountered during parturition.** **6. Discuss reproduction management practices and determine how they affect reproductive performance.**
The Interdependence of Organisms		
F.12.7 Investigate how organisms both cooperate and compete in ecosystems	E.12.1 Understand the application of agricultural technolgies that can sustain production while reducing environmental impact E.12.2 Analyze benefits, costs, and consequences of land use E.12.6 Analyze benefits, costs, and consequences of processing food and fiber on the environment	

Instructions: Please fill out the third column illustrating how the proposed agriculture class meets the state standards in the first two columns. Information in the third column should include knowledge, concepts and skills, and a summery of the equivalent instructional time for the equivalent course. The first column lists Wisconsin's Model Academic Standards for Science. Column two illustrates the various agriculture performance standards that have been crosswalked to the science performance standards in the first column.

F.12.8 Using the science themes, infer changes in ecosystems prompted by the introduction of new species, environmental conditions, chemicals, and air, water, or earth pollution	D.12.2 Discuss the impact that climate and water have on the food, fiber, and ornamental horticulture production cycles throughout the world D.12.5 Describe how biotechnology can enhance food and fiber production D.12.6 Understand the impact emerging technologies within hydroponics, aquaculture, and biotechnology have on the food and fiber industries and natural resources. E.12.1 Understand the application of agricultural technologies that can sustain production while reducing environmental impact E.12.2 Analyze benefits, costs, and consequences of land use E.12.3 Explain the impact of climate change on existing agricultural systems E.12.4 Analyze practices used by farmers to reduce erosion and runoff to maintain soil fertility and productivity E.12.5 Analyze the impact and use of chemicals in the production and processing of food and fiber E.12.6 Analyze benefits, costs, and consequences of processing food and fiber on the environment	
Matter, Energy, and Organization in Living Systems		
F.12.9 Using the science themes, investigate energy systems (related to food chains) to show how energy is stored in food (plants and animals) and how energy is released by digestion and metabolism	D.12.1 Describe the global utilization of Wisconsin's food, fiber, and ornamental plant products E.12.3 Explain the impact of climate change on existing agricultural systems	**1. Explain the functions of feed.** **2. Identify the various feed types and characteristics.** **3. Explain how animals are fed.** **4. Identify the various types of digestive systems found in animals.** **5. Identify the major parts of the digestive system and describe their functions.** **6. Describe chemical processes of breaking down food in the body.** **7. Explain the role of enzymes in helping to digest starches.** **8. Describe the conditions necessary for the digestion of starches.**
F.12.10 Understand the impact of energy on organisms in	No significant match found	**1. Identify the essential nutrients for animal**

Instructions: Please fill out the third column illustrating how the proposed agriculture class meets the state standards in the first two columns. Information in the third column should include knowledge, concepts and skills, and a summery of the equivalent instructional time for the equivalent course. The first column lists Wisconsin's Model Academic Standards for Science. Column two illustrates the various agriculture performance standards that have been crosswalked to the science performance standards in the first column.

living systems		**production.** **2. Discuss the importance of water as a nutrient.** **3. Discuss the importance of carbohydrates as nutrients.** **4. Discuss the importance of lipids as nutrients.** **5. Discuss the importance of proteins as nutrients.** **6. Discuss the importance of minerals as nutrients.** **7. Discuss the importance of vitamins as nutrients.** **8. Discuss the importance of feed analysis.** **9. Identify end products of food which are capable of being absorbed and how they** **are utilized by animals.** **10. Describe the role of the plasma membrane in animal cells and explain how a selectively permeable membrane functions.** **11. Explain how nutrient absorption is affected by food digestibility.**
F.12.11 Investigate how the complexity and organization of organisms accommodates the need for obtaining, transforming, transporting, releasing, and eliminating the matter and energy used to sustain an organism	D.12.1 Describe the global utilization of Wisconsin's food, fiber, and ornamental plant products D.12.2 Discuss the impact that climate and water have on the food, fiber, and ornamental horticulture production cycles throughout the world D.12.5 Describe how biotechnology can enhance food and fiber production. E.12.3 Explain the impact of climate change on existing agricultural systems	**1. Examine the skeletal system, and describe its functions.** **2. Identify the components of bone, discuss the three cell types found in bones, and discuss how bones are classified.** **3. Differentiate between moveable and immoveable joints.** **4. Discuss the chemical process in the formation of bones and calcification.** **5. Identify and recall the names of bones found in livestock and companion animals.** **6. Explain the integumentary system, and describe the two layers of skin.** **7. Examine the muscular system, describe the three types of muscle tissue, and explain how muscles contract to create movement.** **8. Describe the creation and utilization of energy for muscle contractions.** **9. Identify common muscles found in livestock and companion animals.** **10. Describe the functions of the mouth, salivary**

Instructions: Please fill out the third column illustrating how the proposed agriculture class meets the state standards in the first two columns. Information in the third column should include knowledge, concepts and skills, and a summery of the equivalent instructional time for the equivalent course. The first column lists Wisconsin's Model Academic Standards for Science. Column two illustrates the various agriculture performance standards that have been crosswalked to the science performance standards in the first column.

		glands, and esophagus. **11. Describe the functions of the stomach and examine the functions of substances and enzymes present in the stomach.** **12. Describe the functions of each of the three segments of the small intestine and examine the functions of the three digestive juices that are mixed with chyme.** **13. Describe the functions of the cecum.** **14. Describe the functions of the large intestine.** **15. Compare and contrast the types of feedstuffs (roughages, concentrates, and supplements/additives).** **16. Distinguish between good quality and poor quality feedstuffs, and examine how processing methods (grinding, rolling, palletizing, etc.) improve palatability and digestibility.** **17. Describe how byproducts (dried distiller's grains, corn gluten meal, etc.) can be used in livestock rations, and examine storage and feeding practices.** **18. Describe the environment of the stomach and its relation to protein digestion.** **19. Observe the action of an enzyme on the breakdown of protein.** **20.Explain the necessity for breaking down protein for utilization by animals.** **21. Understand the effects that bovine somatotropin has on the cow.** **22. Understand the arguments for and against the use of growth hormone in cows.**
The Behavior of Organisms		
F.12.12 Trace how the sensory and nervous systems of various organisms react to the internal and external environment and transmit survival or learning stimuli to cause changes in behavior or responses	D.12.2 Discuss the impact that climate and water have on the food, fiber, and ornamental horticulture production cycles throughout the world D.12.5 Describe how biotechnology can enhance food and fiber production	

Crosswalk Between: *Wisconsin's Model Academic Standards for Science* **and**
Wisconsin's Model Academic Standards for Agricultural Education

Instructions: Please fill out the third column illustrating how the proposed agriculture class meets the state standards in the first two columns. Information in the third column should include knowledge, concepts and skills, and a summery of the equivalent instructional time for the equivalent course. The first column lists Wisconsin's Model Academic Standards for Science. Column two illustrates the various agriculture performance standards that have been crosswalked to the science performance standards in the first column.

	E.12.3 Explain the impact of climate change on existing agricultural systems	
G. SCIENCE APPLICATIONS	**Agricultural Education Standards**	**Crosswalk of Local School Curriculum**
Performance Standards	**Performance Standards**	
By the end of Grade 12 students will:	*By the end of Grade 12 students will:*	
G.12.1 Identify personal interests in science and technology; account for implications that these interests might have for future education, and options to be considered	D.12.4 Explore traditional and nontraditional food, fiber, and ornamental horticultural jobs/careers and identify the necessary skills, aptitudes, and abilities B.12.5 Explore various career opportunities in the food, fiber, and natural resources industries using available forms of technology B.12.6 Access information identifying the postsecondary education programs, both in and outside of Wisconsin, leading to careers in the food, fiber, and natural F.12.4 Research a career in agricultural business marketing and management	
G.12.2 Design, build, evaluate, and revise models and explanations related to the earth and space, life and environmental, and physical sciences	D.12.2 Discuss the impact that climate and water have on the food, fiber, and ornamental horticulture production cycles throughout the world E.12.3 Explain the impact of climate change on existing agricultural systems E.12.4 Analyze practices used by farmers to reduce soil erosion and runoff to maintain soil fertility and productivity	
G.12.3 Analyze the costs, benefits, or problems resulting from a scientific or technological innovation, including implications for the individual and the community	A.12.2 Understand the variety, complexity, and size of the agricultural industry in the world A.12.3 Describe how global interdependence benefits the production and distribution of food and fiber B.12.1 Apply knowledge of technology to identify and solve problems B.12.4 Access and use information for a class presentation about the impact of new technologies on the products manufactured and produced; e.g., biotechnology D.12.5 Describe how biotechnology can enhance food and fiber production D.12.6 Understand the impact emerging technologies within hydroponics, aquaculture, and biotechnology have	

Instructions: Please fill out the third column illustrating how the proposed agriculture class meets the state standards in the first two columns. Information in the third column should include knowledge, concepts and skills, and a summery of the equivalent instructional time for the equivalent course. The first column lists Wisconsin's Model Academic Standards for Science. Column two illustrates the various agriculture performance standards that have been crosswalked to the science performance standards in the first column.

	on the food and fiber industries and natural resources E.12.1 Understand the application of agricultural technologies that can sustain production while reducing environmental impact E.12.2 Analyze benefits, costs, and consequences of land use E.12.4 Analyze practices used by farmers to reduce erosion and runoff to maintain soil fertility and productivity E.12.5 Analyze the impact and use of chemicals in the production and processing of food and fiber E.12.6 Analyze benefits, costs, and consequences of processing food and fiber on the environment	
G.12.4 Show how a major scientific or technological change has had an impact on work, leisure, or the home	B.12.4 Access and use information for a class presentation about the impact of new technologies on the products manufactured and produced; e.g., biotechnology D.12.6 Understand the impact emerging technologies within hydroponics, aquaculture, and biotechnology have on the food and fiber industries and natural resources	
G.12.5 Choose a specific problem in our society, identify alternative scientific or technological solutions to that problem and argue its merits	B.12.1 Apply knowledge of technology to identify and solve problems	
H. SCIENCE IN SOCIAL AND PERSONAL PERSPECTIVES	**Agricultural Education Standards**	**Crosswalk of Local School Curriculum**
Performance Standards	**Performance Standards**	
By the end of Grade 12 students will:	*By the end of Grade 12 students will::*	
H.12.1 Using the science themes and knowledge of the earth and space, life and environmental, and physical sciences, analyze the costs, risks, benefits, and consequences of a proposal concerning resource management in the community and determine the potential impact of the proposal on life in the community and the region	A.12.1 Identify how political policies and issues shape and influence food and fiber systems A.12.3 Describe how global interdependence benefits the production and distribution of food and fiber D.12.3 Understand how public policy affects the food, fiber, and ornamental plant industries cite examples of conflicts between environmentalists and producers of food and fiber E.12.1 Understand the application of agricultural technologies that can sustain production while reducing environmental impact	

Crosswalk Between: *Wisconsin's Model Academic Standards for Science* and
Wisconsin's Model Academic Standards for Agricultural Education

Instructions: Please fill out the third column illustrating how the proposed agriculture class meets the state standards in the first two columns. Information in the third column should include knowledge, concepts and skills, and a summery of the equivalent instructional time for the equivalent course. The first column lists Wisconsin's Model Academic Standards for Science. Column two illustrates the various agriculture performance standards that have been crosswalked to the science performance standards in the first column.

	E.12.2 Analyze benefits, costs, and consequences of land use E.12.3 Explain the impact of climate change on existing agricultural systems E.12.4 Analyze practices used by farmers to reduce erosion and runoff to maintain soil fertility and productivity E.12.5 Analyze the impact and use of chemicals in the production and processing of food and fiber E.12.6 Analyze benefits, costs, and consequences of processing food and fiber on the environment	
H.12.2 Evaluate proposed policy recommendations (local, state, and/or national) in science and technology for validity, evidence, reasoning, and implications, both short and long term	A.12.1 Identify how political policies and issues shape and influence food and fiber Systems B.12.1 Apply knowledge of technology to identify and solve problems C.12.2 Practice skills relating to communication, problem-solving, and decision-making through individual, group, and team processes D.12.3 Understand how public policy affects the food, fiber, and ornamental plant industries E.12.2 Analyze benefits, costs, and consequences of land use F.12.1 Describe how the production, distribution, and marketing of food and fiber is part of a complex economic system	
H.12.3 Show how policy decisions in science depend on many factors, including social values, ethics, beliefs, and time-frames, and considerations of science and technology	A.12.1 Identify how political policies and issues shape and influence food and fiber systems B.12.1 Apply knowledge of technology to identify and solve problems D.12.3 Understand how public policy affects the food, fiber, and ornamental plant industries E.12.2 Analyze benefits, costs, and consequences of land use E.12.6 Analyze benefits, costs, and consequences of processing food and fiber on the environment F.12.1 Describe how the production, distribution, and	**1. Examine the physical and chemical composition and nutritional value of meat products.** **2. Identify the wholesale and retail cuts of beef, pork, and lamb.** **3. Describe the beef grading system; analyze factors that affect quality and yield grades; and practice calculating yield and quality grades.** **4. Describe the swine grading system, and analyze factors that affect quality and yield grades.** **5. Describe the lamb grading system, and analyze**

Instructions: Please fill out the third column illustrating how the proposed agriculture class meets the state standards in the first two columns. Information in the third column should include knowledge, concepts and skills, and a summery of the equivalent instructional time for the equivalent course. The first column lists Wisconsin's Model Academic Standards for Science. Column two illustrates the various agriculture performance standards that have been crosswalked to the science performance standards in the first column.

	marketing of food and fiber is part of a complex economic system	**factors that affect quality and yield grades.** **6. Demonstrate the ability to estimate quality and yield grades of live animals.**
H.12.4 Advocate a solution or combination of solutions to a problem in science or technology	B.12.1 Apply knowledge of technology to identify and solve problems D.12.3 Understand how public policy affects the food, fiber, and ornamental plant industries D.12.5 Describe how biotechnology can enhance food and fiber production D.12.6 Understand the impact emerging technologies within hydroponics, aquaculture, and biotechnology have on the food and fiber industries and natural resources	
H.12.5 Investigate how current plans or proposals concerning resource management, scientific knowledge, or technological development will have an impact on the environment, ecology, and quality of life in a community or region	A.12.1 Identify how political policies and issues shape and influence food and fiber systems A.12.3 Describe how global interdependence benefits the production and distribution of food and fiber B.12.1 Apply knowledge of technology to identify and solve problems D.12.3 Understand how public policy affects the food, fiber, and ornamental plant industries D.12.6 Understand the impact emerging technologies within hydroponics, aquaculture, and biotechnology have on the food and fiber industries and natural resources E.12.2 Analyze benefits, costs, and consequences of land use E 12.4 Analyze practices used by farmers to reduce erosion and runoff to maintain soil fertility and productivity	
H.12.6 Evaluate data and sources of information when using scientific information to make decisions.	B.12.3 Use technology to acquire, organize, and communicate information by entering, modifying, retrieving, and storing data B.12.4 Access and use information for a class presentation about the impact of new technologies on the products manufactured and produced; e.g., biotechnology D.12.3 Understand how public policy affects the food, fiber, and ornamental plant industries	
H.12.7 When making decisions, construct a plan that	B.12.3 Use technology to acquire, organize, and	

Instructions: Please fill out the third column illustrating how the proposed agriculture class meets the state standards in the first two columns. Information in the third column should include knowledge, concepts and skills, and a summery of the equivalent instructional time for the equivalent course. The first column lists Wisconsin's Model Academic Standards for Science. Column two illustrates the various agriculture performance standards that have been crosswalked to the science performance standards in the first column.

includes the use of current scientific knowledge and scientific reasoning.	communicate information by entering, modifying, retrieving, and storing data D.12.3 Understand how public policy affects the food, fiber, and ornamental plant industries	

j:\data\bevshell\ag science activities\agscience crosswalk.doc